

A CHECKLIST OF THE ANTS OF MONTANA

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The history of myrmecology in Montana probably began in 1913 with Wheeler's description of *Formica subpolita* from Helena and 1914 when he described a new species, *Manica hunteri* from Gallatin County. A considerable hiatus ensued until 1932 when Cole recorded *Pogonomyrmex occidentalis* from Custer County.

In 1973 Borchert and Anderson published a thorough ecological analysis of the ants of the Bearpaw Mountains, one of the small ranges, which is mostly in Hill County. Thirty-three species were reported.

In 1984 Youngs and Campbell published the results of a study of ants preying upon the western spruce budworm near the western border. They reported 4 species of *Camponotus* and 7 species of *Formica* from 3 localities in Missoula County and one in Sanders County, but they failed to indicate which species was taken in which locality. These records are indicated by YC.

Six other authors have contributed a few records each. From Wing we got four records as spots on maps. D. R. Smith contributed three species for the whole state. Five records are represented by gifts of specimens from Creighton.

Finally we are greatly indebted to Roy R. Snelling for sending us 63 additional records based on specimens in the Los Angeles County Natural History Museum.

During the summers of 1956, 1961, 1963, 1964 and 1965, while we were still at the University of North Dakota (Grand Forks), we made seven field trips into Montana to observe and collect ants in 32 of the 56 counties. These expeditions yielded a total of 151 records in 64 species. (A record is a species in a locality.)

From all these records we extracted a list of 76 species of ants for the state of Montana.

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Manuscript received by the editor January 6, 1988.

THE BIOMES OF MONTANA

Our usual guide to biomes is Odum's map, but this time it has failed us, for it puts the whole of Montana in the Grassland Biome. Only the eastern third is in that biome and is continuous with the Grassland Biome in North Dakota. The middle third might be considered ecotone between the Grassland Biome and the Coniferous Forest Biome of the western third, for the prairie is broken by many small mountain ranges, which are outliers of the Rocky Mountains and the Coniferous Forest Biome. In the western mountains the timberline is at about 9500 ft in the south to 6000 ft in the north. Above that is the Alpine Biome.

With only limited ecological data we have made no attempt to list the ants which characterize each biome.

TYPE LOCALITIES IN MONTANA

We have found only two type localities in Montana:—

Manica hunteri. Wheeler, W. M. 1914: 121. "Described from a dozen specimens taken by Dr. S. J. Hunter from a couple of nests on the slopes of two mountains on the Madison River, nearly opposite the mouth of Beaver Creek, Montana, at an altitude of about 7,500 feet."

Formica curiosa. Creighton 1935: 8. "TYPE LOCALITY.—Lake McGregor, Montana. This is a small lake about 35 miles west of Kalispell."

PLAN FOR THE LIST

Subfamilies and genera are arranged as in the Smithsonian catalog (Smith 1979). The species in each genus are arranged alphabetically except in *Formica* where they are first divided into species-groups; here we do not follow Smith, because we have transferred the *microgyna* species-group into the *rufa* species-group.

The localities in which a species has been collected are grouped by counties (see Figure 1) which are arranged alphabetically. The localities represented by our collecting are preceded by an asterisk. Those in the Borchert-Anderson study are followed by (BA); those of Youngs-Campbell by (YC); those from Snelling by (LA). (See introduction.) Others are followed by the name of the author and year of publication of the book or article. Finally the elevation above sea level is given wherever known.

ABBREVIATIONS AND SYMBOLS

CO. = county; Cr. = Creek; ft = feet; For. = Forest; Hwy. = Highway; mi = miles; Mon. = Monument; Mt. = Mountain; Mts. = Mountain; Nat. = National; nr = near; NL = No locality cited; Pk. = Park; R. = River; St. = State.

Compass directions are represented by symbols N, E, S, W and various combinations thereof. It is understood that they are followed by the word "of", e. g. "5 mi S Ekalaka" would be read aloud as "five miles south of Ekalaka." For localities not near any town we use the legal description. For those not familiar with the legal description we recommend an American treatise on surveying or our 1963 book (p. 76-77). Take, for example, a locality in Richland County: 24-19N-57E; the complete legal description would read "section 24, Township 19 North, Range 57 East" which would be abbreviated to "sec. 24, T. 19 N., R. 57 E."; to save space we resort to extreme abbreviation 24-19N-57E.

THE ANTS OF MONTANA

Myrmica americana Weber. CARTER CO. *5 mi S Ekalaka. GLACIER NAT. PK. NL (LA). LEWIS AND CLARK CO. Helena (Weber 1948). MUSSELLSHELL CO. *Roundup; *20 mi S Roundup in Bull Mts. PARK CO. *Cooke City. RICHLAND CO. *24-19N-57E.

Myrmica brevinodis Emery (= *incompleta*). CASCADE CO. *13 mi S Neihart on US Hwy. 89 in Little Belt Mts. FLATHEAD CO. 7 mi N Kalispell (LA); 4 mi W Whitefish (LA); McGregor Lake (LA). GLACIER CO. *8 mi SE St. Mary on US Hwy. 89. HILL CO. Bearpaw Mts. (Weber 1950); 28-29N-16E 4000 ft, 23-28N-16E 4700 ft and 32-27N-16E 4700 ft in Bearpaw Mts. (BA). LEWIS AND CLARK CO. Helena (Weber 1950). LINCOLN CO. *US Hwy. 2 nr Idaho boundary; Happy's Inn (LA). PARK CO. *Cooke City 7500 ft.

Myrmica brevispinosa Wheeler. CASCADE CO. Belt (Weber 1950).

Myrmica emeryana Forel. CASCADE CO. *5 N Neihart in Little Belt Mts. CHOUTEAU CO. 17-28N-15E 3900 ft in Bearpaw Mts. (BA). FREGUS CO. *Maiden 5000 ft in Judith Mts.; *Rock Cr. 5800 ft in Big Snowy Mts. GLACIER NAT. PK. Fish Cr. Ranger Sta. (LA). HILL CO. 28-29N-16E 4000 ft, 23-28N-16E 4700 ft, 32-27N-16E 4700 ft, 19-28N-16E 5000 ft and 20-28N-16E 5700 ft in Bearpaw Mts. (BA). LAKE CO. Flathead (LA).

Myrmica fracticornis Emery. FERGUS CO. *Maiden 5000 ft in Judith Mts.; *Rock Cr. 5800 ft in Big Snowy Mts. FLATHEAD CO. McGregor Lake (LA). GLACIER CO. Browning (Weber 1948). PARK CO. *Cooke City 7500 ft.

Myrmica lobifrons Pergande. CASCADE CO. *Monarch in Little Belt Mts. DAWSON CO. *4 mi SW Intake. CHOUTEAU CO. 17-28N-15E 3900 ft in Bearpaw Mts. (BA). FERGUS CO. *Maiden 5000 ft in Judith Mts. GLACIER CO. *13 mi SE St. Mary on US Hwy. 89. HILL CO. 16-30N-16E 3300 ft, 28-29N-16E 4000 ft, 32-27N-16E 4700 ft, 19-28N-16E 5000 ft and 20-28N-16E 5700 ft in Bearpaw Mts. (BA).

Myrmica monticola Wheeler. GALLATIN CO. *Quake Lake 7000 ft.

Myrmica tahoensis Wheeler. NL (Smith 1979).

Manica hunteri (Wheeler). CASCADE CO. Belt (LA). FERGUS CO. *Maiden 5000 ft in Judith Mts.; *Rock Cr. 5800 ft in Big Snowy Mts. GALLATIN CO. *Quake Lake 7000 ft; Madison R. nr Beaver Cr. 7500 ft (Wheeler 1914) (Type locality). GLACIER CO. St. Mary (LA). HILL CO. 23-28N-16E 4700 ft, 32-27N-16E 4700 ft, 19-28N-16E 5000 ft and 20-28N-16E 5700 ft in Bearpaw Mts. (BA). MEAGHER CO. *18 mi E Townsend 5000 ft. PARK CO. *Cooke City 7500 ft.

Pogonomyrmex occidentalis (Cresson). CARBON CO. *3 mi N Warren. CARTER CO. *10 mi SW Ekalaka 3500 ft; *Medicine Rocks St. Pk. 3500 ft. CUSTER CO. NL (Cole 1932). DAWSON CO. *Makoshika St. Pk. 8 mi S Glendive; *Glendive; *4 mi S Intake. FERGUS CO. *US Hwy. 191 at Missouri R. MUSSELSHELL CO. *Roundup. RICHLAND CO. *24-19N-57E; *32-21N-58E; *11-20N-59E; *4 mi SSW Sidney. ROSEBUD CO. *Rosebud. TREASURE CO. *Bighorn. YELLOWSTONE CO. *Pompeys Pillar St. Pk. (summit).

Pogonomyrmex owyheeii Cole. NL (Smith 1979).

Aphaenogaster occidentalis (Emery) (= *subterranea*). HILL CO. 16-30N-16E 3300 ft, 28-29N-16E 4000 ft and 19-28N-16E 5000 ft in Bearpaw Mts. (BA). LINCOLN CO. Troy (LA). PHILLIPS CO. *Landsky and *Zortman in Little Rocky Mts.

Veromessor lobognathus (Andrews). *CARTER CO. 10 mi SW Ekalaka 3500 ft (Wheeler and Wheeler 1967).

Crematogaster cerasi (Fitch). CARTER CO. *Medicine Rock St. Pk. 8 mi S Glendive 3500 ft. DAWSON CO. *Makoshika St. Pk. 8 mi S Glendive. YELLOWSTONE CO. *Pompeys Pillar St. Pk. (summit).

Monomorium minimum (Buckley). DAWSON CO. *4 mi SW Intake.

Solenopsis molesta (Say). BIG HORN CO. *Pryor Mt. (W side). CUSTER CO. *Miles City. DAWSON CO. *4 mi SW Intake; *Makoshika St. Pk. 8 mi S Glendive. HILL CO. 16-30N-16E 3300 ft, 28-29N-16E 4000 ft and 20-28N-16E 5700 ft in Bearpaw Mts. (BA).

Leptothorax muscorum (Nylander). FERGUS CO. *Maiden 5000 ft in Judith Mts.; *Rock Cr. 5800 ft in Big Snowy Mts. GLACIER CO. *2 mi, *8 mi and *13 mi SE St. Mary on US Hwy. 89. GLACIER NAT. PK. Avalanche Cr. (LA); Fish Cr. Ranger Sta. (LA); Logan Pass (LA). HILL CO. 32-27N-16E 4700 ft in Bearpaw Mts. (BA).

Leptothorax nevadensis Wheeler. PHILLIPS CO. *Landusky in Little Rocky Mts.

Leptothorax provancheri Emery. FLATHEAD CO. McGregor Lake (LA).

Leptothorax rugatulus (Emery). HILL CO. 28-29N-16E 4000 ft and 32-27N-16E 4700 ft in Bearpaw Mts. (BA). LINCOLN CO. Troy (LA). PHILLIPS CO. *Landusky in Little Rocky Mts.

SUBFAMILY DOLICHODERINAE

Forelius pruinus (Roger). CARTER CO. *10 mi SW Ekalaka 3500 ft. RICHLAND CO. *24-19N-57E.

Conomyrma insana (Buckley). CARTER CO. *Medicine Rocks St. Pk. 3500 ft.

Tapinoma sessile (Say). BIG HORN CO. *Pryor Mt. (N slope). CARTER CO. *5 mi S. Ekalaka. CASCADE CO. *Monarch in Little Belt Mts. FERGUS CO. *Rock Cr. 5800 ft in Big Snowy Mts. GLACIER CO. *13 mi SE St. Mary on US Hwy. 89; Browning (LA). HILL CO. 16-30N-16E 3300 ft, 28-29N-16E 4000 ft and 19-28N-16E 5000 ft in Bearpaw Mts. (BA). PARK CO. *Cooke City 7500 ft. PHILLIPS CO. *Zortman in Little Rocky Mts.

SUBFAMILY FORMICINAE

Camponotus herculeanus (Linnaeus). CHOUTEAU CO. 17-28N-15E 3900 ft in Bearpaw Mts. (BA). FLATHEAD CO. 7 mi S Somers (LA). GLACIER CO. *8 mi and *13 mi SE St. Mary on US Hwy. 89. HILL CO. 32-27N-16E 4700 ft and 20-28N-16E 5700 ft in Bearpaw Mts. (BA). MISSOULA CO. (YC). PARK CO. *Cooke City 7500 ft. SANDERS CO. (YC).

Camponotus laevigatus (F. Smith). LINCOLN CO. *US Hwy. 2 nr Idaho boundary. MISSOULA CO. and SANDERS CO. (YC).

Camponotus modoc Wheeler. MISSOULA CO. and SANDERS CO. (YC).

Camponotus vicinus Mayr. CARTER CO. *5 mi S Ekalaka. BROADWATER CO. *5 mi E Townsend. CHOUTEAU CO. 17-28N-15E 3900 ft in Bearpaw Mts. (BA). FERGUS CO. *Rock Cr. 5800 ft in Big Snowy Mts. FLATHEAD CO. McGregor Lake (LA). HILL CO. 28-29N-16E 4000 ft and 19-28N-16E 5000 ft in Bearpaw Mts. (BA). LEWIS AND CLARK CO. Helena (LA). LINCOLN CO. *13 mi W Libby; Troy (LA). MISSOULA CO. and SANDERS CO. (YC).

Lasius alienus (Foerster). CASCADE CO. *Monarch in Little Belt Mts. FLATHEAD CO. McGregor Lake (LA). GLACIER NAT. PK. Fish Cr. Ranger Sta. (LA). HILL CO. 16-30N-16E 3300 ft and 28-29N-16E 4000 ft in Bearpaw Mts. (BA). PARK CO. *Cooke City 7500 ft. PHILLIPS CO. *Landusky and *Zortman in Little Rocky Mts.

Lasius crypticus Wilson. DAWSON CO. *Makoshika St. Pk. 8 mi S Glendive.

Lasius fallax Wilson. GALLATIN CO. *Quake Lake 7000 ft.

Lasius flavus (Fabricius) (= *brevicornis microps*). CASCADE CO. *Monarch in Little Belt Mts. HILL CO. 28-29N-16E 4000 ft, 23-28N-16E 4700 ft and 17-28N-15E 3900 ft in Bearpaw Mts. (BA). MEAGHER CO. *18 mi E Townsend 5000 ft. PHILLIPS CO. *Zortman in Little Rocky Mts.

Lasius neoniger Emery. BROADWATER CO. *5 mi E Townsend. CHOUTEAU CO. 17-28N-15E 3900 ft in Bearpaw Mts. (BA). HILL CO. 16-30N-16E 3300 ft, 28-29N-16E 4000 ft, 28-29N-16E 4700 ft, 19-28N-16E 5000 ft and 20-28N-16E 5700 ft in Bearpaw Mts. (BA).

Lasius sitiens Wilson. BLAINE CO. *15 mi SW Cleveland in Bearpaw Mts.

Lasius sitkaensis Pergande (= *pallitarsis*). CASCADE CO. Belt (LA). CHOUTEAU CO. 17-28N-15E 3900 ft in Bearpaw Mts. (BA). FERGUS CO. *Maiden 5000 ft in Judith Mts.; *Rock Cr. 5800 ft in Big Snowy Mts. FLATHEAD CO. 4 mi S Somers (LA); 4 mi W Whitefish (LA). GLACIER CO. *13 mi SE St. Mary on US Hwy. 89. GLACIER NAT. PK. Logan Pass (LA). HILL CO. 16-30N-16E 3300 ft, 28-29N-16E 4000 ft, 19-28N-16E 5000 ft, 23-28N-16E 4700 ft and 32-27N-16E 4700 ft in Bearpaw Mts. (BA). LINCOLN CO. Troy (LA).

Lasius subumbratus Viereck. CASCADE CO. Belt (LA). GLACIER NAT. PK. Fish Cr. Ranger Sta. (LA). HILL CO. 19-28N-16E 5000 ft, 23-28N-16E 4700 ft and 32-27N-16E 4700 ft in Bearpaw Mts. (BA).

Lasius umbratus (Nylander). GLACIER CO. Browning (LA). HILL CO. 16-30N-16E 3000 ft in Bearpaw Mts. (BA).

Acanthomyops coloradensis (Wheeler). NL (Wing 1968). HILL CO. 16-30N-16E 3300 ft, 28-29N-16E 4000 ft and 19-28N-16E 5000 ft in Bearpaw Mts. (BA).

Acanthomyops interjectus (Mayr). RICHLAND CO. *24-19N-27E.

Acanthomyops latipes (Walsh). HILL CO. 16-30N-16E 3300 ft and 28-29N-16E 4000 ft in Bearpaw Mts. (BA). LAKE CO. Flathead Lake (LA).

Acanthomyops murphyi (Forel). CARTER CO. *5 mi S Ekalaka. CASCADE CO. Belt (LA).

Acanthomyops occidentalis (Wheeler). NL (Wing 1968).

SPECIES-GROUP *NEOGAGATES* OF *FORMICA*

Formica bradleyi Wheeler. CARTER CO. *Medicine Rocks St. Pk. 3500 ft. MISSOULA CO. Missoula (Halverson et al. 1976).

Formica lasioides Emery. BLAINE CO. *15 mi SW Cleveland in Bearpaw Mts. CARTER CO. *5 mi S Ekalaka. CASCADE CO. *5 mi N Neihart in Little Belt Mts.; Belt (LA). FLATHEAD CO. McGregor Lake (LA). GALLATIN CO. *Quake Lake 7000 ft (slave of *F. puberula*). HILL CO. 16-30N-16E 3800 ft, 25-29N-16E 4000 ft and 23-27N-16E 4700 ft in Bearpaw Mts. (BA). MISSOULA CO. and SANDERS CO. (YC).

Formica limata Wheeler. PHILLIPS CO. *Landusky in Little Rocky Mts.

Formica neogagates Emery. BIG HORN CO. *Pryor Mt. (-6S-26E).

SPECIES-GROUP *FUSCA* OF *FORMICA*

Formica altipetens Wheeler. CHOUTEAU CO. 17-28N-15E 3900 ft in Bearpaw Mts. (BA). FERGUS CO. *Crystal Lake 6200 ft in Big Snowy Mts. HILL CO. 28-29N-16E 4000 ft in Bearpaw Mts. (BA).

Formica argentea Wheeler. BLAINE CO. *15 mi SW Cleveland in Bearpaw Mts. DAWSON CO. *4 mi SW Intake. MISSOULA CO. (YC). RICHLAND CO. *24-19N-57E. SANDERS CO. (YC).

Formica fusca Linnaeus. CASCADE CO. *5 mi N Neihart in Little Belt Mts. CHOUTEAU CO. 17-28N-15E 3900 ft in Bearpaw Mts. (BA). FERGUS CO. *Maiden 5000 ft in Judith Mts.; *Rock Cr. 5800 ft in Big Snowy Mts. (slave of *F. puberula*). FLATHEAD CO. 7 mi N Kalispell

(LA). GLACIER NAT. PK. *Hanging Gardens; Fish Cr. Ranger Sta. (LA); Logan Pass (LA). HILL CO. 16-30N-16E 3300 ft, 28-29N-16E 4000 ft, 19-28N-16E 5000 ft, 20-28N-16E 5700 ft, 23-28N-16E 4700 ft and 32-27N-16E 4700 ft in Bearpaw Mts. (BA). LAKE CO. Flathead Lake (LA). LINCOLN CO. *13 mi W Libby; Troy (LA). MISSOULA CO. and SANDERS CO. (YC).

Formica hewitti Wheeler. FLATHEAD CO. McGregor Lake (LA). GLACIER NAT. PK. Fish Cr. Ranger Sta. HILL CO. 28-29N-16E 4000 ft in Bearpaw Mts. (BA). MISSOULA CO. and SANDERS CO. (YC).

Formica montana Emery. BEAVERHEAD CO. 6 mi N Dell (LA). HILL CO. 19-28N-16E 5000 ft in Bearpaw Mts. (BA)

Formica neoclara Emery. BLAINE CO. *Zurich. CASCADE CO. Belt (LA).

Formica neorufibarbis Emery. CHOUTEAU CO. 17-28N-15E 3900 ft in Bearpaw Mts. (BA). FERGUS CO. *Maiden in Judith Mts. FLATHEAD CO. 4 mi NE Bigfork (LA). GALLATIN CO. 8 mi W Yellowstone (LA). GLACIER CO. *2 mi and *8 mi SE St. Mary on US Hwy. 89. GLACIER NAT. PK. Fish Cr. Ranger Sta. (LA); Many Glaciers (LA); Avalanch Cr. (LA); Logan Pass (LA). HILL CO. 19-28N-16E 5000 ft, 20-28N-16E 5700 ft, 23-28N-16E 4700 ft and 32-27N-16E 4700 ft in Bearpaw Mts. (BA). MISSOULA CO. (YC). PARK CO. *Cooke City 7500 ft. SANDERS CO. (YC).

Formica subpolita Mayr. HILL CO. 19-28N-16E 5000 ft in Bearpaw Mts. (BA) LEWIS AND CLARK CO. Helena (Wheeler 1913: 561).

Formica subsericea Say. CARBON CO. *11 mi NE Wyoming boundary on US Hwy. 212 (temporary slave of *F. fossiceps*). CARTER CO. *5 mi S Ekalaka (slave of *Polyergus breviceps*). CASCADE CO. *Monarch and *5 mi N Neihart in Little Belt Mts. FLATHEAD CO. 7 mi N Kalispell (LA). MISSOULA CO. (YC). PARK CO. *Cooke City 7500 ft; 5 mi NW Gardiner (LA). SANDERS CO. (YC).

SPECIES-GROUP *EXSECTA* OF *FORMICA*

Formica opaciventris Emery. YELLOWSTONE NAT. PK. *NE Entrance 7200 ft.

SPECIES-GROUP RUFA (INCLUDING FORMER *MICROGYNA*) OF *FORMICA*

Formica ciliata Mayr. FERGUS CO. *S wall of Missouri R. valley on US Hwy. 191. JEFFERSON CO. Elkhorn Mt. (LA).

Formica comata Wheeler. NL (Smith 1979).

Formica criniventris Wheeler. HILL CO. 19-28N-16E 5000 ft in Bearpaw Mts. RICHLAND CO. *24-19N-57E.

Formica dakotensis Emery. BIG HORN CO. *Pryor Mt. (-6S-26E). CHOUTEAU CO. 17-28N-15E 3900 ft in Bearpaw Mts. (BA). HILL CO. 16-30N-16E 3300 ft and 20-28N-16E 5700 ft in Bearpaw Mts. (BA). GLACIER CO. Browning (LA). LEWIS AND CLARK CO. Helena (LA).

Formica fossiceps Buren. CARBON CO. *11 mi NE Wyoming boundary on US Hwy. 212 (-9S-19E).

Formica haemorrhoidalis Emery. BIG HORN CO. *-7S-26E. BLAINE CO. *15 mi SW Cleveland in Bearpaw Mts. HILL CO. 20-28N-16E 5700 ft in Bearpaw Mts. (BA).

Formica integroides Emery. GALLATIN CO. Gallatin (LA).

Formica laeviceps Creighton. TREASURE CO. *Bighorn.

Formica microgyna Wheeler. HILL CO. 28-29N-16E 4000 ft in Bearpaw Mts. (BA).

Formica obscuripes Forel. BLAINE CO. *15 mi SW Cleveland in Bearpaw Mts. CARBON CO. *15 mi S Bridger. CHOUTEAU CO. 17-28N-15E 3900 ft in Bearpaw Mts. (BA). GLACIER NAT. PK. Fish Cr. Ranger Sta. (Coll. by Creighton). HILL CO. 16-30N-16E 3300 ft, 19-28N-16E 5000 ft and 20-28N-16E 5700 ft in Bearpaw Mts. (BA). LAKE CO. Flathead Lake (Coll. by Creighton). MISSOULA CO. and SANDERS CO. (YC). VALLEY CO. Frazee (LA).

Formica obscuriventris Mayr. LAKE CO. Flathead Lake (Creighton 1940). PARK CO. *Cooke City 7500 ft. RAVALLI CO. 30 mi S Missoula (Coll. by Creighton).

Formica oreas Wheeler. BIG HORN CO. *Pryor Mt. (N slope). CASCADE CO. *5 mi N Neihart in Little Belt Mts. FERGUS CO. *Rock Cr. 5000 ft in Big Smoky Mts. FLATHEAD CO. *Hungry Horse 3000 ft. GLACIER CO. Browning (LA). GLACIER NAT. PK. *3 mi S Logan Pass 5500 ft. MEAGHER CO. *18 mi E Townsend 5000 ft.

Formica querquetulana Kennedy & Dennis. PARK CO. *Cooke City 7500 ft.

Formica spatulata Buren. FLATHEAD CO. McGregor Lake (LA). HILL CO. 20-28N-16E 5700 ft in Bearpaw Mts. (BA).

Formica whymperi Forel. GLACIER NAT. PK. Fish Cr. Ranger Sta. (Coll. by Creighton). LAKE CO. Flathead Lake (LA).

SPECIES-GROUP *SANGUINEA* OF *FORMICA*

Formica curiosa Creighton. FLATHEAD CO. McGregor Lake (Creighton 1935. Type locality) (LA). ROOSEVELT CO. Culbertson (LA).

Formica obtusopilosa Emery. BROADWATER CO. *5 mi E Townsend.

Formica puberula Emery. FERGUS CO. *Rock Cr. 5800 ft in Big Snowy Mts. (slave: *F. fusca*). GALLATIN CO. *Quake Lake 7000 ft (slave: *F. lasioides*). HILL CO. 16-30N-16E 3300 ft in Bearpaw Mts.

Formica rubicunda Emery. HILL CO. 28-29N-16E 4000 ft in Bearpaw Mts. (BA).

Formica subnuda Emery. CASCADE CO. Belt (LA). CHOUTEAU CO. 17-28N-15E 3900 ft in Bearpaw Mts. (BA). FERGUS CO. *Maiden 5000 ft in Judith Mts. GLACIER CO. *13 mi SE St. Mary on US Hwy. 89. GLACIER NAT. PK. Avalanche Cr. (LA); Fish Cr. Ranger Sta. (LA). HILL CO. 16-30N-16E 3300 ft, 28-29N-16E 4000 ft, 19-28N-16E 5000 ft, 23-28N-16E 4700 ft and 32-27N-16E 4700 ft in Bearpaw Mts. (BA).

Polyergus breviceps Emery. CARTER CO. *5 mi S Ekalaka (slave: *Formica subsericea*). JEFFERSON CO. Elkhorn Mts. (M. R. Smith 1947). LAKE CO. Flathead Lake (M. R. Smith 1947).

INTERESTING MONTANA ANTS

THATCHING ANTS. Figure 2. Thatching ant mounds are conspicuous features of the grasslands. This is partly due to the size of the mound itself, but also to the fact that vegetation around the nest is taller than that of the surrounding prairie. Most of the nest is underground, but it is surmounted by a dome-shaped thatch mound. A typical mound is about 25 inches (66 cm) in diameter and 12 inches (30 cm) high. It is constructed of twigs, grass blades, dried herbaceous stems or any other slender bits of material, assembled by the workers from neighboring vegetation. The thatching ants collected in Montana are *Formica haemorrhoidalis*, *F. obscuripes*, *F. obscuriventris* and *F. oreas*.

MOUND-BUILDERS. The most common mound-builder is the harvester *Pogonomyrmex occidentalis*, which is distributed throughout



Figure 2. Thatch mound of *Formica obscuripes*. Carbon Co. 15 mi south of Bridger. The card measures 3 by 5 inches.

the grasslands. A typical mound is conoidal or paraboloidal, 24 inches (60 cm) in basal diameter and 5½ inches (14 cm) high. It is composed of excavated soil and covered with a layer of fine gravel collected by the workers from the surface of the surrounding soil. A mound is rendered more conspicuous by a circular bare area which surrounds it. These areas average 5 ft (1.5 m) in diameter. The mounds of *P. owyheeii* are similar.

OBLIGATORY SLAVE-MAKERS. Obligatory slave-makers are incapable of performing any of the nest-functions and are therefore wholly dependent upon their slaves. The story of how they raid the nest of some species of *Formica* to get their slaves is fascinating but too long for this essay. The Montana slave-maker was *Polyergus breviceps* and its slave was *Formica subsericea*.

FACULTATIVE SLAVE-MAKERS. These are in the genus *Formica* and they enslave other species of *Formica*. They are, however, capable of performing all necessary nest functions; hence they can, and often do, get along without slaves. The species of this group that

have been taken in Montana are the five species in the *sanguinea* species-group. The reported slaves were *F. fusca* and *F. lasioides*.

HARVESTING ANTS. These ants collect seeds when they are abundant and store them in the nest to be consumed in times of scarcity. Montana harvesting species are *Pogonomyrmex occidentalis*, *P. owyheeii* and *Veromessor lobognathus*. The last named species is—for us—the most interesting Montana ant. During the ten years preceding 1965 we traveled 50,000 miles to observe and collect ants in all the continental states (except Alaska) and provinces (except Saskatchewan) north of Mexico and west of the 100th meridian and did general collecting in all biomes. We were, however, especially alert for *V. lobognathus* ever since we had discovered it in North Dakota in 1955 (Wheeler and Wheeler 1956). "We suspected that if this species occurred in southwestern North Dakota and on the western border of South Dakota, it might also be found in southeastern Montana. Consequently our first stop was at Ekalaka, where we called upon Mr. Marshall Lambert, Director of the Carter County Museum. As a paleontologist Mr. Lambert is thoroughly acquainted with the region. We described the desired habitat. He showed us on our contour map where to go and how to get there. Within 15 minutes after we arrived at the place he had recommended, we found a nest of *V. lobognathus*." (Wheeler and Wheeler 1967.) As in the Dakotas this nest was on a treeless south-facing slope where much of the surface was bare. The slopes were always near junipers which were on the north-facing slope. This species is a characteristic inhabitant of the Pinyon-Juniper Biome.

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